

EXHIBIT E14

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Supplemental Expert Report & Analysis of Johnson & Johnson Baby Powder and Valeant Shower to Shower Talc Products for Amphibole Asbestos



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March 11, 2018

**Supplemental Expert Report
& Analysis of Johnson &
Johnson Baby Powder &
Valiant Shower to Shower
Talc Products for Amphibole
Asbestos**

March 11, 2018

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Supplemental Expert Report & References

1. A.M. Blount 1991
2. A.M. Blount 1990
3. EPA AHERA 1987
4. R.J. Lee and Drew Van Orden
Asbestos in Buildings (2008)
5. R.F. Dodson, et al. (2001)
6. Manual of Mineralogy 1999
7. D.R. Veblen, et al.
Asbestiform Chain Silicates (1997)
8. Veblen & Burnham (1978)
9. R.L. Virta (1985)

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**Appendix A
Kazan McClain Satterley Greenwood
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Analysis of Johnson & Johnson Baby Powder & Valeant Shower to Shower Talc Products for Amphibole (Tremolite) Asbestos

Supplemental Expert Report



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Overview

This report describes the procedures and methodology used to analyze 30 separate containers of talc containing Johnson & Johnson (J&J) Baby Powder (BP) and Valeant Shower to Shower (SS) talc products for the presence of amphibole asbestos fibers. The container construction (metal vs. plastic) and labeling differences indicate that the products cover a span of many years. The three Valeant Shower to Shower containers were plastic and appear to be contemporary.

The 30 J&J/SS talc products that were analyzed for this report were sent to MAS, LLC by three different law firms. These were The Lanier Law Firm, Kazan McClain Satterley & Greenwood and Simon Greenstone Panatier Bartlett.

Since the amount of possible amphibole content of the J&J BP/Valeant SS talc product samples was expected to be at trace levels (0.1% or less), it was recognized that this analysis would require the use of an analytical transmission electron microscope (ATEM). ATEM is the only analytical method with the appropriate sensitivity for this type of trace mineral analysis as it can positively identify potential fibrous amphibole structures by energy dispersive x-ray analysis (EDXA) for mineral fiber chemistry and crystalline structure information by selective area electron diffraction (SAED). Additionally, the ATEM provides good fibrous morphology information that can eliminate obvious non-asbestiform particulates.

It was conservatively estimated by Blount that for every 1,000 amphibole particles present, there would be 1,000,000 talc particles.¹ This large number of talc-to-amphibole structure ratio, coupled with TEM filter preparation overloading issues, reduces the probability of detecting any trace amounts of fibrous amphibole structures that may be present in the talc sample by ATEM analysis. In the past, this type of ATEM analysis usually involved the examination of many hundreds of TEM grid openings, thus requiring many hours of TEM instrumentation time.

Reducing the amount of talc particles, as compared to potential amphibole structures during sample preparation, would increase the amphibole sensitivity in the ATEM. It also increases the efficiency of the analyst by eliminating the need to examine of many hundreds of TEM grid openings. One method of talc-to-amphibole separation can be done through the use of heavy

¹ A.M. Blount "Amphibole Content of Cosmetic and Pharmaceutical Talcs", Environ. Health Perspectives, Vol. 94, 1991, pp. 225-230.

liquid density separation during the sample preparation stage, as previously described by A. M. Blount.^{1, 2}

Using the Blount talc density heavy liquid preparation method for these J&J BP/Valeant SS samples, our ATEM analysis showed that of the 30 J&J BP/Valiant SS product samples analyzed for this report, 17 samples were found to contain detectable amounts of amphibole asbestos (tremolite series and ferro-anthophyllite). The amphibole concentration range for the 17 J&J BP/Valeant SS samples that were positive for fibrous amphibole asbestos ranged from between 8,690 fibers/gram to 15,100,000 fibers/gram.

Among the 17 talc container samples that were positive, four different amphibole asbestos types were found including tremolite, ferro-anthophyllite, richterite and actinolite. The percentage for each of the fibrous amphibole asbestos types found in our analysis were approximately 92.8% tremolite, 4.4% ferro-anthophyllit type, 2.4% richterite and 0.4% actinolite. No anthophyllite or chrysotile fibers/bundles were found in any of the 30 J&J talc samples we analyzed. A more detailed description for the lack of anthophyllite or chrysotile fiber findings, if they were, in fact, present in the J&J talc samples, can be found in the Discussion and Conclusion Section of this report.

Fibrous Talc

In addition to tremolite series and ferro-anthophyllite amphiboles, 15 of the samples were observed to contain fibrous talc. A full quantitative TEM analysis of the fibrous talc was not performed at this time. Only a semi-quantitative analysis was done in the ATEM based on grid opening estimation. The fibrous talc estimated results ranged from common to trace amounts.

Materials and Methods

Sample Log-In Procedure

The J&J BP/Valeant SS talc containers that were analyzed for this report were received from the three different Law firms (Lanier, Kazan and Simon Greenstone) from Sept. 1, 2016 to April 21, 2017. The breakdown of MAS sample numbers to each particular law firm is as follows:

3 Kazan McClain Satterley Greenwood J&J Samples

MAS Sample Number	Sample Description	Date Samples Received at MAS
M65205-001	Johnson's Baby Powder	9/22/2016
M65208-001	Johnson's Baby Powder (Hospital Dispensing Only)	9/22/2016
M65228-001	Johnson's Baby Powder	9/22/2016

² Process Mineralogy IX: The Minerals, Metals & Materials Society, 1990, A.M. Blount "Detection and Quantification of Asbestos and Other Trace Minerals in Powdered Industrial-Mineral Samples", pp. 557-570.

17 The Lanier Law Firm J&J Samples

MAS Sample Number	Sample Description	Date Sample Received at MAS
M65329-041	Johnson's Baby Powder	9/1/2016
M65329-043	Johnson's Baby Powder	11/14/2016
M66173-001, 002 & 003	Johnson's Baby Powder Containers	3/3/2017
M66203-001,002,003,004,006,007	Johnson's Baby Powder Containers	3/8/2017
M66309-002 & 003	Johnson's Baby Powder Containers	3/23/2017
M66352-001 & 002	Johnson's Baby Powder Containers	3/28/2017
M66405-001 & 002	Johnson's Baby Powder Containers	4/5/2017

10 Simon Greenstone Panatier Bartlett J&J and Shower to Shower Samples

MAS Sample Number	Sample Description	Date Sample Received at MAS
M66507-001	SGPB 11-28-16(1) Johnson's Baby Powder 1.5 oz.	4/21/2017
M66508-001	SGPB 1-28-17 (1) Johnson's Baby Powder 1.5 oz.	4/21/2017
M66509-001	SGPB 1-28-17 (2) Johnson's Baby Powder 22 oz.	4/21/2017
M66510-001	SGPB 2-27-17 (3) Valeant Shower to Shower Powder 13 oz.	4/21/2017
M66511-001	SGPB 3-7-17 (1) Valeant Shower to Shower Powder 13 oz.	4/21/2017
M66512-001	SGPB 3-21-17 (2) Valeant Shower to Shower Powder 13 oz.	4/21/2017
M66513-001	SGPB 3-21-17 (4) Johnson's Baby Powder, 1.5 oz.	4/21/2017
M66514-001	SGPB 4-7-17 (1) Johnson's Baby Powder, 9 oz.	4/21/2017
M66515-001	SGPB 4-19-17 (6) Johnson's Baby Powder, 4 oz.	4/21/2017
M66516-001	SGPB 4-19-17 (7) Johnson's Baby Powder, 1.5 oz.	4/21/2017

Sample Preparation

The received J&J talc sample containers were weighed on a Sartorius Research balance and the weight recorded. The J&J Baby Powder talc containers were inverted by hand approximately five times. After this mixing, approximately 1 to 2 grams of the talc (Sartorius Research Balance) was removed from inside the J&J talc container and placed in a 15 ml scintillation vial. The scintillation vial was then placed in a Fisher Scientific Iso-temp muffle furnace Model #650 at 400°F for a minimum of 4 hours to remove any organic material.

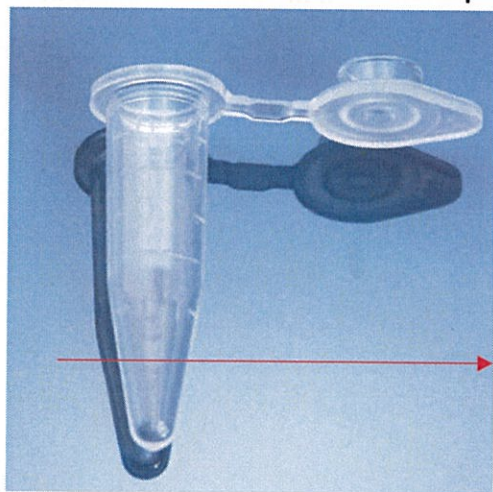
Approximately 10-25mg (Sartorius Research Balance) from the muffled talc sample aliquot was placed into a labeled Eppendorf micro-centrifuge tube (MC T) (Premium 1.5mL MCT Graduated Tubes Cat. No. 05-408-12).

Approximately 1.2 ml of Heavy Liquid (Lithium heteropolytungstates solution, GeoLiquids, Inc., Cat. No. LST010 density 2.85 g/cc) was added to the MCT containing the talc samples prepped and mixed with a disposable mixing rod for 10 to 20 seconds. The combined talc and LST heavy liquid samples were placed into a vacuum desiccator (JEOL EMDSC-U10A) to remove air bubbles for 15 minutes prior to centrifugation at a pressure of approx. 8 torr.

The MCT sample tubes were then placed in an Eppendorf micro-centrifuge (Model No. 5415D) set at 9,000 RPM for total of 90 minutes at room temperature. After removal of the MCT tubes from the centrifuge, they were flash frozen in liquid nitrogen, and the MCT tip was immediately removed with a pre-cleaned 6 inch steel cleaver into a clean 45 mL flat bottom disposable centrifuge tube. Figure 1 shows the cut area on the MCT tip.³

Figure 1:

Cut Line for Removal of MCT Tip



Red line is showing cut area on MCT tip

³ Before the use of the LMT heavy liquid for sample separation, Lithium Metatungstate solution (LMT Liquid LLC.) was used that had a density of 2.95 g/cc. This density had to be adjusted to 2.84 g/cc by the addition of deionized water. This was done by mixing 400 ml of the LMT solution with 40 ml of deionized water into a 500 ml plastic hydrometer tube. The density was checked with a floating hydrometer (WR. North American Cat. No. 34620). Three of the J&J Baby Powder samples, reported here, were prepared by the LMT solution. These were MAS sample numbers M65205-001, M65208-001 and M65228-001.

Deionized water was added to the centrifuge tube to bring the volume to approximately 45 ml. The 45 ml centrifuge tube was capped and inverted by hand 5 times to distribute the collected material in the bottom of the MCT tip. The 45 ml mixture was then immediately and continuously filtered onto a 25mm Mixed Cellulose Ester (MCE) filter with a 0.22µm pore size (Millipore). After the mixture was filtered, the excess heavy liquid was washed through the filter with the addition of approximately 100 ml of deionized water. The prepared MCE filter was placed in a new disposable plastic 47mm petri dish and allowed to dry at ambient room temperature in a HEPA hood for a minimum of 2 hours.

The processed MCE filter samples were directly prepared on to TEM 100 µm size grid openings (2 for analysis and 1 for archive) using the standard TEM AHERA filter preparation protocol.⁴

Process Laboratory Blanks

For each set of samples that were prepared by the heavy liquid method, one process laboratory blank was run with that set of samples. These process blank MCE filters were prepared in the same exact same manner as the talc samples (heavy liquid, filtration on MCE filters etc.) but without any talc material. For the TEM analysis, 100 grid openings were analyzed for each of the process blank per sample set.

ATEM Amphibole Analysis Procedure

JEOL 1200EX TEMs equipped with either a Noran or an Advanced Analysis Technologies (light element) energy dispersive x-ray analyzer (EDXA) were employed for this analysis. TEM samples were analyzed at a screen magnification of 20,000X amphibole fibers or bundles with substantially parallel sides and an aspect ratio of 5:1 or greater, and at least 0.5µm in length were counted as per AHERA asbestos structure sizing rules. Positive identification of amphibole asbestos requires EDXA for mineral chemistry conformation and selected area electron diffraction (SAED) for each amphibole type. However, at times, an amphibole bundle may have a diameter that is too thick to acquire a SAED pattern, then only the mineral chemistry can be used.

Counting Rules

A minimum of 20 grid openings to a maximum of 100 grid openings were analyzed for these J&J Baby Powder samples. The 20 to 100 grid opening counts were split evenly between two grids. If the amount of amphibole fibers/bundles exceeded 100 structures before 20 grid openings were analyzed, then the analysis was stopped as long as a minimum of 4 grid openings from 2 different grids were analyzed. If there were less than three amphibole structures found in the

⁴ U.S. Environmental Protection Agency (USEPA), 1987. Asbestos Hazard Emergency Response Act, 40 CFR Part 763, Appendix A to subpart E. USEPA, Washington, D.C.

first 20 grid openings, then 100 grid openings were analyzed. If 3 or more amphiboles were found in the first 20 grid openings, then the analysis was stopped at 20 grid openings.

All amphibole fibers/bundles that meet the above stated size criteria were recorded on the MAS TEM structure count bench sheets for each sample. Length and width of each amphibole fiber/bundle was recorded and identified. Every amphibole structure identified and counted by the analyst required observation of an EDXA spectra matching the mineral chemistry for that particular amphibole and, if possible, a SAED amphibole pattern. EDXA spectra and SAED patterns (if an SAED pattern was possible) are recorded/saved for the first 10 amphibole structures found in the sample. After the 10th amphibole structure, a minimum of 1 EDXA and 1 SAED was collected/saved for each additional group of 10 amphibole structure counted. If a J&J BP/SS talc sample contained more than one type of amphibole, then the same identification rules were used for each amphibole type. Representative photographs were taken of the amphibole fibers/bundles found from each of the samples that were positive for amphiboles.

Fibrous Talc Estimation

A number of the J&J BP samples were found to contain fibrous talc during the TEM analysis. A quantitative analysis of the number of fibrous talc particles was not done at this time. However, a semi-quantitative estimate of the number of fibrous talc particles present in four random grid openings was scored as follows:

- 1) Abundant : (>11 fibrous talc particles)
- 2) Common: (4 to 10 fibrous talc particles)
- 3) Trace: (1 to 3 fibrous talc particles)

This estimation was based on the talc fibers/bundles having at least a 5:1 aspect ratio, at least 0.5µm in length and substantially parallel sides. One representative talc fiber or bundle was recorded (EDXA, SAED & photographed) for each of the samples that contained fibrous talc.

Results

The results for all 30 J&J BP/SS samples are shown in Tables 1 through 18. Table 1 shows a summary of all 30 samples that were analyzed with the amount of fibrous amphiboles per gram of talc found for each sample. The amphibole per gram of talc concentration ranged from below our lower detection limit of less than approximately 9,000 fibers per gram to an amphibole concentration of 15,100,000 fibers/gram. Tables 2 through 18 provide the summary of findings for each of the 17 samples that were analyzed concerning the identification of each amphibole fiber or bundle. Length and width dimension, aspect ratio, and average aspect ratio for each sample set are provided.

All of the process blanks run with each set of samples were found to be negative for any asbestos fiber types as shown in Table 19.

All the analytical data and photographs can be found in Appendix A, B & C to this report. This data includes sample TEM count sheets, EDXA spectra, SAED micrographs and representative photo-micrographs of the fibrous amphiboles found. Photographs of either the J&J BP or Valeant SS containers associated with each of the 30 J&J talc samples that we analyzed are also provided.

Table 1.
Analysis of Johnson & Johnson Baby Powder andValeant Shower to Shower
Talc Products for Amphibole (Tremolite) Asbestos
(Summary)

Samples Received From: Kazan McClain Satterley and Greenwood

Sample ID	Sample Description	Amphibole Asbestos Fibers/g	Fibrous Talc
M65205-001	White – fine grained homogeneous powder	15,100,000	Trace
M65208-001	White – fine grained homogeneous powder	376,000	Trace
M65228-001	White – fine grained homogeneous powder	445,000	NSD

Samples Received From: The Lanier Law Firm

Sample ID	Sample Description	Amphibole Asbestos Fibers/g	Fibrous Talc
M65329-041	White – fine grained homogeneous powder	1,310,000	NSD
M65329-043	White – fine grained homogeneous powder	938,000	Common
M66173-001	White – fine grained homogeneous powder	NSD	Trace
M66173-002	White – fine grained homogeneous powder	301,000	Trace
M66173-003	White – fine grained homogeneous powder	4,120,000	Trace
M66203-001	White – fine grained homogeneous powder	18,700	Common
M66203-002	White – fine grained homogeneous powder	NSD	Trace
M66203-003	White – fine grained homogeneous powder	NSD	Trace
M66203-004	White – fine grained homogeneous powder	NSD	NSD
M66203-006	White – fine grained homogeneous powder	9,120	Trace
M66203-007	White – fine grained homogeneous powder	9,030	NSD
M66309-002	White – fine grained homogeneous powder	NSD	Trace
M66309-003	White – fine grained homogeneous powder	NSD	Trace
M66352-001	White – fine grained homogeneous powder	NSD	NSD
M66352-002	White – fine grained homogeneous powder	17,200	NSD

Table 1.
Analysis Summary Continued

Samples Received From: The Lanier Law Firm Continued

M66405-001	White – fine grained homogeneous powder	45,200	Trace
M66405-002	White – fine grained homogeneous powder	NSD	Common

Samples Received From: Simon Greenstone Panatier Bartlett

Sample ID	Sample Description	Amphibole Asbestos Fibers/g	Fibrous Talc
M66507-001	White – fine grained homogeneous powder	NSD	Trace
M66508-001	White – fine grained homogeneous powder	NSD	NSD
M66509-001	White – fine grained homogeneous powder	NSD	NSD
M66510-001	White – fine grained homogeneous powder	18,200	NSD
M66511-001	White – fine grained homogeneous powder	NSD	NSD
M66512-001	White – fine grained homogeneous powder	8,800	NSD
M66513-001	White – fine grained homogeneous powder	NSD	NSD
M66514-001	White – fine grained homogeneous powder	24,700	NSD
M66515-001	White – fine grained homogeneous powder	8,740	NSD
M66516-001	White – fine grained homogeneous powder	8,690	NSD

Table 2.
TEM Fiber Data for Johnson's Baby Powder – M65205-001

Sample received From: Kazan McClain Satterley and Greenwood

Str. #	Length	Width	Aspect Ratio	Asbestos Type
	(µm)	(µm)		
-1	1.7	0.2	8.5	Tremolite
-2	2.6	0.3	8.7	Tremolite
-3	3.5	0.2	17.5	Tremolite
-4	7.5	0.6	12.5	Tremolite
-5	4	0.2	20	Tremolite
-6	2.4	0.3	8	Tremolite
-7	3	0.4	7.5	Tremolite
-8	5.7	0.9	6.3	Tremolite
-9	4.6	0.6	7.7	Tremolite
-10	2	0.2	10	Tremolite
-11	6	0.7	8.6	Tremolite
-12	5.8	0.4	14.5	Tremolite
-13	11.5	0.9	12.8	Tremolite
-14	10	0.8	12.5	Tremolite
-15	10.3	0.4	25.8	Tremolite
-16	4	0.8	5	Tremolite
-17	2.6	0.2	13	Tremolite
-18	5	0.3	16.7	Tremolite
-19	7.5	1.5	5	Tremolite
-20	6	0.3	20	Tremolite
-21	10	1	10	Tremolite
-22	7	0.7	10	Tremolite
-23	6.5	0.8	8.1	Tremolite
-24	4	0.7	5.7	Tremolite
-25	12	0.9	13.3	Tremolite
-26	7	0.3	23.3	Tremolite
-27	2	0.3	6.7	Tremolite
-28	5.8	0.7	8.3	Tremolite
-29	4	0.3	13.3	Tremolite
-30	7	0.6	11.7	Tremolite
-31	10	0.9	11.1	Tremolite
-32	9	0.8	11.3	Tremolite
-33	4	0.5	8	Tremolite
-34	8	0.7	11.4	Tremolite
-35	5	0.3	16.7	Tremolite
-36	3	0.4	7.5	Tremolite
-37	14	0.6	23.3	Tremolite
-38	10	0.9	11.1	Tremolite

Table 2.
M65205-001 Continued
Sample Received From Kazan McClain Satterley and Greenwood

-39	4	0.4	10	Tremolite
-40	8	1	8	Tremolite
-41	4	0.7	5.7	Tremolite
-42	9	0.8	11.3	Tremolite
-43	5	0.7	7.1	Tremolite
-44	7	0.4	17.5	Tremolite
-45	6	0.8	7.5	Tremolite
-46	8	0.7	11.4	Tremolite
-47	6.5	0.3	21.7	Tremolite
-48	7	0.3	23.3	Tremolite
-49	16	0.9	17.8	Tremolite
-50	4.3	0.3	14.3	Tremolite
-51	6	0.8	7.5	Tremolite
-52	4	0.6	6.7	Tremolite
-53	4.5	0.7	6.4	Tremolite
-54	7	1	7	Tremolite
-55	16	2	8	Tremolite
-56	7	0.3	23.3	Tremolite
-57	4	0.4	10	Tremolite
-58	4	0.3	13.3	Tremolite
-59	8	0.9	8.9	Tremolite
-60	8	1	8	Tremolite
-61	2	0.4	5	Tremolite
-62	3.7	0.4	9.3	Tremolite
-63	8	0.5	16	Tremolite
-64	6	0.7	8.6	Tremolite
-65	6	0.2	30	Tremolite
-66	2	0.3	6.7	Tremolite
-67	14	1	14	Tremolite
-68	16	0.9	17.8	Tremolite
-69	3.5	0.4	8.8	Tremolite
-70	16	0.9	17.8	Tremolite
-71	9	0.8	11.3	Tremolite
-72	9	0.4	22.5	Tremolite
-73	4.5	0.5	9	Tremolite
-74	4.3	0.5	8.6	Tremolite
-75	4.4	0.2	22	Tremolite
-76	4	0.6	6.7	Tremolite
-77	18	2	9	Tremolite
-78	2.4	0.2	12	Tremolite

Table 2.

M65205-001 Continued

Sample Received From Kazan McClain Satterley and Greenwood

-079	2.2	0.3	7.3	Tremolite
-080	6.3	0.2	31.5	Tremolite
-081	4.6	0.4	11.5	Tremolite
-082	11	1	11	Tremolite
-083	4	0.2	20	Tremolite
-084	5	0.7	7.1	Tremolite
-085	8.5	0.6	14.2	Tremolite
-086	4.5	0.05	9	Tremolite
-087	7	0.50	14	Tremolite
-088	7	0.60	11.7	Tremolite
-089	4	0.50	8	Tremolite
-090	3	0.70	4.3	Tremolite
-091	4	0.50	8	Tremolite
-092	2.4	0.30	8	Tremolite
-093	4	0.20	20	Tremolite
-094	5	0.60	8.3	Tremolite
-095	5.3	0.70	7.6	Tremolite
-096	6	10	6	Tremolite
-097	3.8	0.30	12.7	Tremolite
-098	7	0.70	10	Tremolite
-099	4.5	0.30	15	Tremolite
-100	2	0.20	10	Tremolite
-101	12	0.70	17.1	Tremolite

Average Aspect Ratio: 12.0

Table 3.

TEM Fiber Data for Johnson's Baby Powder – M65208-001

Samples Received From: Kazan McClain Satterley and Greenwood

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	4.2	0.8	5.3	Tremolite
-2	5	0.6	8.3	Tremolite
-3	13.5	0.4	33.8	Richterite
-4	4.3	0.8	5.4	Tremolite
-5	5	0.7	7.1	Tremolite
-6	4.7	0.9	5.2	Tremolite
-7	11.7	1.5	7.8	Tremolite
-8	3.2	0.45	7.1	Richterite
-9	9	1.2	7.5	Tremolite
-10	8.1	0.45	18.0	Richterite

Average Aspect Ratio: 10.5

Table 4.

TEM Fiber Data for Johnson's Baby Powder – M65228-001

Samples Received From: Kazan McClain Satterley and Greenwood

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	4.5	0.6	7.5	Tremolite
-2	8	1.5	5.3	Tremolite
-3	6.8	0.45	15.1	Richterite
-4	4.5	0.9	5.0	Tremolite
-5	3	0.45	6.7	Tremolite

Average Aspect Ratio: 7.9

Table 5.
TEM Fiber Data for Johnson's Baby Powder - M65329-041

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	4.2	0.44	9.5	Tremolite
-2	9.66	1.95	5.0	Tremolite
-3	4.25	0.4	10.6	Tremolite
-4	2.65	0.2	13.3	Tremolite
-5	9.45	0.94	10.1	Tremolite
-6	7.35	0.36	20.4	Tremolite
-7	5.04	0.42	12.0	Tremolite
-8	4.7	0.3	15.7	Tremolite
-9	2.62	0.41	6.4	Tremolite
-10	3.15	0.15	21.0	Tremolite
-11	4.35	0.86	5.1	Tremolite
-12	2.35	0.3	7.8	Tremolite
-13	4.55	0.28	16.3	Tremolite
-14	2.73	0.44	6.2	Tremolite
-15	4.25	0.45	9.4	Tremolite
-16	4	0.5	8.0	Tremolite
-17	11.35	0.95	11.9	Tremolite

Average Aspect Ratio: 11.1

Table 6.
TEM Fiber Data for Johnson's Baby Powder - M65329-043

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	3.2	0.4	8.0	Tremolite
-2	5	0.9	5.6	Tremolite
-3	2.9	0.5	5.8	Tremolite
-4	2.5	0.22	11.4	Tremolite
-5	3.2	0.25	12.8	Tremolite
-6	2.9	0.22	13.2	Tremolite
-7	25.7	4	6.4	Tremolite
-8	36	6	6.0	Tremolite
-9	2.2	0.22	10.0	Tremolite
-10	7.3	1.4	5.2	Tremolite
-11	18	1.5	12.0	Tremolite
-12	6	0.5	12.0	Tremolite

Average Aspect Ratio: 9.0

Table 7.
TEM Fiber Data for Johnson's Baby Powder - M66173-002

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	24.8	4.3	5.8	Tremolite
-2	2.7	0.5	5.4	Tremolite
-3	4.3	0.6	7.2	Tremolite
-4	2	0.22	9.1	Tremolite
-5	2.8	0.22	12.7	Tremolite
-6	4.5	0.4	11.3	Tremolite
-7	2.9	0.45	6.4	Tremolite
-8	2.2	0.22	10.0	Tremolite
-9	13	2.5	5.2	Tremolite

Average Aspect Ratio: 8.1

Table 8.
TEM Fiber Data for Johnson's Baby Powder - M66173-003

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	6.4	0.22	29.1	Tremolite
-2	13.9	1	13.9	Tremolite
-3	7.2	0.9	8.0	Tremolite
-4	2.2	0.22	10.0	Tremolite
-5	2.7	0.22	12.3	Tremolite
-6	4.1	0.45	9.1	Tremolite
-7	6.8	1	6.8	Richterite
-8	10	1	10.0	Tremolite
-9	1.8	0.25	7.2	Tremolite
-10	2	0.2	10.0	Tremolite
-11	13	1.8	7.2	Tremolite
-12	7.2	1.1	6.5	Tremolite
-13	5.7	0.25	22.8	Tremolite
-14	1.8	0.22	8.2	Tremolite
-15	6.2	0.45	13.8	Tremolite
-16	2.2	0.22	10.0	Tremolite
-17	2.2	0.22	10.0	Tremolite
-18	2.9	0.22	13.2	Tremolite
-19	2.7	0.22	12.3	Tremolite
-20	7	0.6	11.7	Tremolite
-21	2.7	0.45	6.0	Tremolite
-22	2.7	0.3	9.0	Tremolite
-23	6.8	0.2	34.0	Tremolite
-24	4	0.7	5.7	Tremolite
-25	4.5	0.4	11.3	Tremolite
-26	2	0.4	5.0	Tremolite
-27	5.4	0.7	7.7	Tremolite
-28	7.1	1.1	6.5	Tremolite
-29	2.4	0.22	10.9	Tremolite
-30	19	2	9.5	Tremolite
-31	7.6	0.4	19.0	Tremolite
-32	9	1.8	5.0	Tremolite
-33	12.2	0.7	17.4	Tremolite
-34	13	0.7	18.6	Tremolite
-35	2	0.4	5.0	Tremolite
-36	3.2	0.3	10.7	Tremolite
-37	3.9	0.22	17.7	Tremolite
-38	4	0.6	6.7	Tremolite

Table 8.
M66173-003 Continued

Samples Received From: The Lanier Law Firm

-39	5.8	0.45	12.9	Tremolite
-40	5.5	0.25	22.0	Tremolite
-41	5.4	0.4	13.5	Tremolite
-42	9	0.7	12.9	Tremolite
-43	2.6	0.4	6.5	Tremolite
-44	11.2	1.5	7.5	Tremolite
-45	4.5	0.22	20.5	Tremolite
-46	2.2	0.22	10.0	Tremolite
-47	20.2	2.6	7.8	Tremolite
-48	4.3	0.6	7.2	Tremolite
-49	2.4	0.45	5.3	Tremolite
-50	11.2	0.4	28.0	Tremolite
-51	12.2	0.5	24.4	Tremolite
-52	15	2.0	7.5	Tremolite
-53	5.5	0.6	9.2	Tremolite
-54	2.7	0.2	13.5	Tremolite
-55	8.2	0.8	10.3	Tremolite
-56	3.2	0.22	14.5	Tremolite
-57	3.7	0.45	8.2	Tremolite
-58	9	1.3	6.9	Tremolite
-59	1.5	0.2	7.5	Tremolite
-60	20.2	3	6.7	Tremolite
-61	4.1	0.4	10.3	Tremolite
-62	4.5	0.7	6.4	Tremolite
-63	3.9	0.22	17.7	Tremolite
-64	5.1	0.25	20.4	Tremolite
-65	9	1.5	6.0	Tremolite
-66	3.5	0.25	14.0	Tremolite
-67	7.8	0.6	13.0	Tremolite
-68	3.5	0.6	5.8	Tremolite
-69	2.4	0.45	5.3	Tremolite
-70	4.9	0.22	22.3	Tremolite
-71	2.9	0.45	6.4	Tremolite
-72	3.2	0.22	14.5	Tremolite
-73	3.5	0.4	8.8	Tremolite
-74	4.7	0.3	15.7	Tremolite

Average Aspect Ratio: 11.7

Table 9.

TEM Fiber Data for Johnson and Johnson Baby Powder - M66203-001

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	14	1.5	9.3	Tremolite
-2	36	4	9.0	Tremolite

Average Aspect Ratio: 9.2

Table 10.

TEM Fiber Data for Johnson and Johnson Baby Powder - M66203-005

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	29.3	1.5	19.5	Tremolite
-2	15	0.9	16.7	Tremolite
-1	12.1	0.9	13.4	Tremolite
-2	11.5	2.2	5.2	Tremolite

Average Aspect Ratio: 13.7

Table 11.

TEM Fiber Data for Johnson and Johnson Baby Powder - M66203-006

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	1.3	0.22	5.9	Tremolite

Average Aspect Ratio: 5.9

Table 12.

TEM Fiber Data for Johnson and Johnson Baby Powder - M66203-007

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	17.7	1.8	9.8	Tremolite

Average Aspect Ratio: 9.8

Table 13.
TEM Fiber Data for Johnson and Johnson Baby Powder - M66352-002

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	11.5	1.3	8.8	Tremolite

Average Aspect Ratio: 8.8

Table 14.
TEM Fiber Data for Johnson and Johnson Baby Powder - M66405-001

Samples Received From: The Lanier Law Firm

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	3.5	0.84	4.2	Tremolite
-2	6.6	0.45	14.7	Tremolite
-3	16.5	0.61	27.0	Tremolite
-4	28.3	1.2	23.6	Tremolite
-5	22.5	0.95	23.7	Tremolite

Average Aspect Ratio: 18.6

Table 15.
TEM Fiber Data for Shower to Shower Body Powder - M66510-001

Samples Received From: Simon Greenstone Panatier Bartlett

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	2.3	0.22	10.5	Actinolite
-2	11.2	0.2	56.0	Richterite

Average Aspect Ratio: 33.2

Table 16.
TEM Fiber Data for Shower to Shower Body Powder - M66512-001

Samples Received From: Simon Greenstone Panatier Bartlett

Str. #	Length (μm)	Width (μm)	Aspect Ratio	Asbestos Type
-1	20	2	10.0	Richterite

Average Aspect Ratio: 10.0

Table 17.
TEM Fiber Data for Johnson and Johnson Baby Powder - M66514-001

Samples Received From: Simon Greenstone Panatier Bartlett

Str. #	Length (μ m)	Width (μ m)	Aspect Ratio	Asbestos Type
-1	5.8	0.45	12.9	Ferro-Anthophyllite
-2	7.2	0.9	8.0	Ferro-Anthophyllite
-3	7.2	0.45	16.0	Ferro-Anthophyllite
-4	4	0.4	10.0	Ferro-Anthophyllite
-5	5.8	0.4	14.5	Ferro-Anthophyllite
-6	2.7	0.4	6.8	Ferro-Anthophyllite
-7	17.3	1.3	13.3	Ferro-Anthophyllite
-8	25.7	0.6	42.8	Ferro-Anthophyllite
-9	16.2	1.5	10.8	Ferro-Anthophyllite
-10	9.2	0.7	13.1	Ferro-Anthophyllite
-11	10.3	0.7	14.7	Ferro-Anthophyllite

Average Aspect Ratio: 14.8

Table 18.
TEM Fiber Data for Johnson and Johnson Baby Powder - M66515-001

Samples Received From: Simon Greenstone Panatier Bartlett

Str. #	Length (μ m)	Width (μ m)	Aspect Ratio	Asbestos Type
-1	20	0.7	28.6	Tremolite

Average Aspect Ratio: 28.6

Table 19.
TEM Fiber Data for Johnson and Johnson Baby Powder - M66516-001

Samples Received From: Simon Greenstone Panatier Bartlett

Str. #	Length (μ m)	Width (μ m)	Aspect Ratio	Asbestos Type
-1	3.7	0.4	9.3	Tremolite

Average Aspect Ratio: 9.3

Table 19. Blank Samples Summary

Blank Sample Number	Date Prepped	Date Analyzed	For Sample Sets	Asbestos Detected	Fibrous Talc Detected
M65228-000	2/14/2017	7/27/2016	M65205 M65208 M65329-041/043	NSD	NSD
M66173-000	3/27/2017	7/27/2017	M66173	NSD	NSD
M66203-000/M66309-000	6/20/2017	6/26/2017	M66405	NSD	NSD
No Blank	NA	NA	M66352	NA	NA
M66512-000	5/9/2017	7/27/2017	M66507 thru M66516	NSD	NSD

Discussion and Conclusions

Using the Blount preparation method for the direct TEM analysis of approximately 10 to 20 mg of talc sample on to a 25 mm MCE filter did not cause any significant overloading of the TEM grids with talc. The overall TEM grid particle loading was estimated at approximately 30%. This consisted of talc particles and fibrous, as well as amphibole asbestos, in the 18 positive samples. If the same weight of talc (approx. 10 to 20 mg) had been directly filtered onto a 25 mm MCE filter, all of the TEM sample preparations would have been too severely overloaded for analysis.

These sample preparations, along with the heavy liquid method, demonstrated the utility of the Blount method by demonstrating the enhanced increase of analytical sensitivity of the TEM analysis for potential amphibole. It also increased the analyst efficiency without any overloading issues.

The Blount method used a weight concentration of about 60 mg of talc for the reported PLM analysis, which is not as sensitive to talc overloading issues as is the TEM. Our use of 10 to 20 mg, instead of 60 mg, was because that weight concentration the TEM grids were too overloaded to analyze.

Using the Blount heavy liquid sample preparation method, we were able to detect fibrous amphiboles in 18 of the 30 J&J samples we analyzed. The majority of the fibrous amphiboles were of the tremolite series (95.6%) and the remaining 4.4% of the fibrous amphiboles found were of the ferro-anthophyllite type. As anticipated and discussed below, neither chrysotile nor anthophyllite were found in any of the J&J talc samples.

Of the 18 positive amphibole samples, 5 samples had only one tremolite fiber detected in a hundred grid openings which represents the limit of detection for this analysis. The finding of one tremolite fiber or bundle is not considered background by this method. This result is significant and can be relied on to quantify the amount of tremolite asbestos contained in these five J&J talc samples. Tremolite is a non-commercial amphibole in a mineral (talc) that is known to have the potential for varying amounts of amphibole asbestos such as tremolite.

There are no known commercial asbestos-containing products that used tremolite as an added ingredient, there are no commercial amphibole mines in North America, and tremolite is not routinely analyzed at trace levels by typical commercial TEM laboratories. For these reasons, it can be stated that: 1) there are no background air levels of tremolite that could have interfered with or contaminated our J&J talc sample analysis^{5,6} and 2) for each set of J&J talc samples that were prepared and analyzed at this laboratory, a process laboratory blank was prepared

⁵ R.J. Lee, D.R. Van Orden, "Airborne Asbestos in Buildings", Regulatory Toxicology and Pharmacology, 50 (2008) pp. 217-225.

⁶ R.F. Dodson, M.F. O'Sullivan, D.R. Brooks and J.R. Bruce, "Asbestos Content of Omentum and Mesentery in Non-occupationally Exposed Individuals", Toxicology and Industrial Health, 2001: 17: pp. 138-143.

simultaneously to determine if there was any cross-contamination. When these process laboratory blanks were analyzed by TEM, no asbestos, including tremolite or chrysotile structures, were found. Therefore, it can be stated, that there was no cross-contamination during sample preparation of the 30 J&J talc samples we analyzed, nor is it our expectation that tremolite asbestos would become a part of these homogenized talc products at a level identified, as a matter of contamination prior to our custody. To do so would be practically impossible.⁷

For the 13 J&J talc samples, the TEM results were less than the limit of detection of approximately 9,000 amphibole fibers per gram. This result cannot be characterized to mean the samples do not contain amphibole fibers. Rather it can only be said that if there are any amphiboles present, they are at less than the detection limit for the TEM analysis. The maximum grid openings analyzed by this method was 100. By increasing the number of grid openings from 100 to either 500 or 1000, the detection limit would decrease to either 1,800 fibers per gram or 900 fibers per gram. Due to time constraints, these analyses have not performed at this time. Additionally, the 13 J&J talc samples analysis at less than the limit of detection, are further evidence of no laboratory cross-contamination.

This heavy liquid method is specific to the asbestos tremolite series, and as anticipated neither anthophyllite or chrysotile was detected. The reason for this is that the heavy liquid solutions (LMT & LST) used for talc separation process had a density of 2.84 to 2.85 g/cm³. Therefore, any minerals with a similar density or lower would not be separated by this method such as chrysotile that has a density of between 2.5 to 2.6 g/cc.⁸

The density of anthophyllite ranges from 2.85 to 3.2 g/cm³. This range of densities is primarily due to the addition of iron (Fe) to the chemical structure. For example, anthophyllite is part of a solid solution series with a chemical formula of Mg₇Si₈O₂₂(OH)₂ to approximately Fe₂Mg₅Si₈O₂₂(OH)₂. Without Fe being present, the density would be at the lower end of the density gradient of 2.85 g/cm³. Again, since anthophyllite is a solid solution series, the amount of iron atoms that can be substituted into the molecular formula of anthophyllite depends on

⁷ In order for the talc in the J&J product containers to be contaminated with trace amounts of tremolite in a homogeneous manner prior to our custody, it would require an extremely sophisticated operation as might be found in a TEM materials laboratory facility. For example, the tremolite contamination talc operation would require access to a true tremolite standard, an analytical balance and sophisticated mixing equipment to homogenize both the talc and tremolite together. Also, it would require sophisticated TEM analytical analysis to verify that the trace amount of tremolite fibers in the manufactured tremolitic talc product are consistent with what is expected for this type of material. Lastly, the finished material would have to be put back into the original J&J talc containing products, then be distributed around the country to individuals willing to sell the "fake" contaminated J&J talc containers on Ebay. To suggest that the tremolite fibers we detected in the J&J talc samples came from some other source other than from the J&J talc itself, is not a rational argument.

⁸ Manual of Mineralogy, Twenty-First Edition, Revised, Cornelis Klein and Cornelius S. Hurlbut, Jr., John Wiley and Sons, 1999.

the iron content of the surrounding rock. This iron atom substituted could be 0, 1, 2 or higher which accounts for the range of anthophyllite densities described here.

With an anthophyllite density of approximately 2.85 g/cm^3 , which is the same as the heavy liquid used, one would not expect separation of this type of anthophyllite from the talc particles using the Blount method and they would not be detected by our analysis.

Therefore, by using the Blount talc separation method, the lack of detection for anthophyllite and chrysotile in the J&J samples we analyzed was anticipated, but not taken as a negative result for either anthophyllite or chrysotile. Anthophyllite was never identified in any of the heavy liquid separation analyses reported in the Blount papers either, as only tremolite was described. Since tremolite has a density of between 3.0 to 3.2 g/cm^3 , it would be separated using the Blount method, as was consistent with our analysis in this report.

As discussed above, fibrous ferro-anthophyllite was found in one J&J sample (M66514-001) that had a much higher iron content than is typically seen at our laboratory for iron-containing anthophyllite. This higher iron content would increase the density to the degree necessary for heavy liquid separation as compared to no iron or low iron anthophyllite as shown by our analysis. This ferro-anthophyllite, depending on the mine location of the J&J talc used for the product we tested, could also be called chesterite (polymorph of anthophyllite) as described by D.R. Veblen for talc samples he analyzed from Chester, Vermont.⁹

The results of this analysis showed that 16 J&J talc samples contained fibrous talc as compared to the platy talc also found in each of the 31 J&J samples reported here. It has been reported by others that fibrous talc is a geological metamorphic transformation of anthophyllite to fibrous talc.^{10,11}

Based on the results of our analysis, it can be stated, that individuals who used Johnson & Johnson's Baby Powder or Valeant Shower to Shower talc products would have, more likely than not, been exposed to fibrous amphibole asbestos.

⁹ D.R. Veblen, P.R. Buseck & C.W. Burnham, "Asbestiform Chain Silicates" *Science*, 198: pp.359-365, 1997.

¹⁰ D.R. Veblen & C.W. Burnham, "New Biopyriboles Chester, Vermont: I. Descriptive Mineralogy", *American Mineralogist*, 63: 1000-1009, 1978.

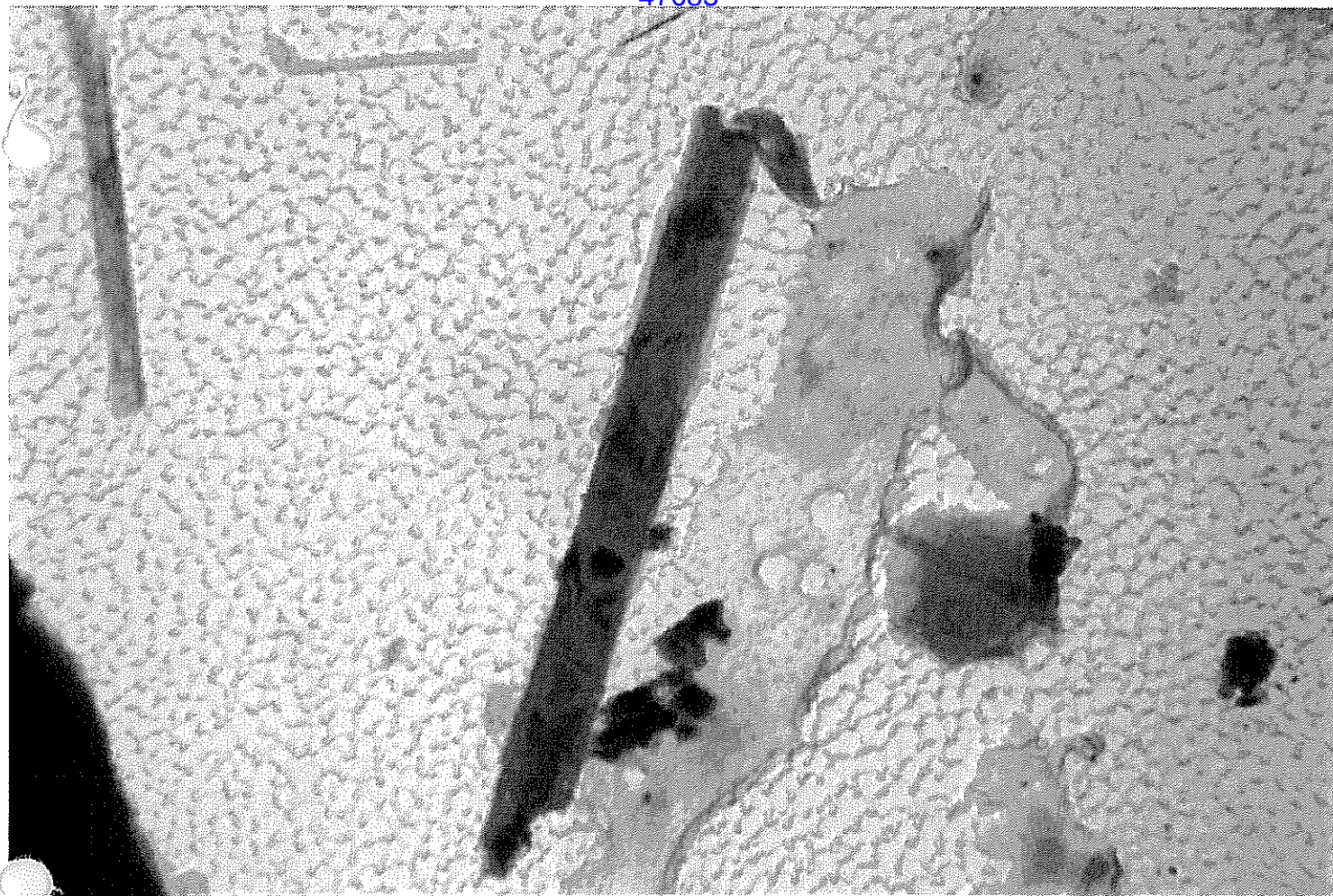
¹¹ R.L. Virta, "The Phase Relationship of Talc and Amphiboles in a Fibrous Talc Sample, Bureau of Mines Report of Investigations 8923, United States Department of the Interior, 1985.

TEM Structure Count Sheet

Project/ Sample No.	M65205-001		Grid Box #	8514	No. of Grids Counted	2
Analyst:	Mehrdad Motamedi			Length	Width	G. O. Area
Date of Analysis	2/21/2017- 2/22/2017- 7/25/2017-7/26/2017		G. O. in microns =	105	105	11025
Initial Weight(g)	0.01224			105	105	11025
Analysis Type	Post Separation Talc Analysis		Grid Acceptance	Yes	Average	11025
Scope No.	Accelerating Voltage	100 KV	Loading%	40%	G.O.s Counted	10
2	Screen Magnification	20 KX	Area Examined mm²			0.110

Str. #	Grid Opening	Str./Asb. Type	Length	Width	Ratio	SAED	EDS
1	E8-B1	F/Tremolite	1.7	0.2	8.5	Observed	<input checked="" type="checkbox"/>
2		F/Tremolite	2.6	0.3	8.7	Observed	<input checked="" type="checkbox"/>
3		F/Tremolite	3.5	0.2	17.5	Observed	<input checked="" type="checkbox"/>
4		F/Tremolite	7.5	0.6	12.5	Observed	<input checked="" type="checkbox"/>
5		F/Tremolite	4.0	0.2	20.0	Observed	<input checked="" type="checkbox"/>
6		F/Tremolite	2.4	0.3	8.0	Observed	<input checked="" type="checkbox"/>
7		F/Tremolite	3.0	0.4	7.5	Observed	<input checked="" type="checkbox"/>
8	G2	B/Tremolite	5.7	0.9	6.3	Observed	<input checked="" type="checkbox"/>
9		M/Tremolite	4.6	0.6	7.7	Observed	<input checked="" type="checkbox"/>
10		F/Tremolite	2.0	0.2	10.0	Observed	<input checked="" type="checkbox"/>
11		F/Tremolite	6.0	0.7	8.6	Observed	<input checked="" type="checkbox"/>
12		F/Tremolite	5.8	0.4	14.5	Observed	
13		B/Tremolite	11.5	0.9	12.8	Observed	
14		F/Tremolite	10.0	0.8	12.5	Observed	
15		B/Tremolite	10.3	0.4	25.8	Observed	<input checked="" type="checkbox"/>
16		F/Tremolite	4.0	0.8	5.0	Observed	
17	I2	F/Tremolite	2.6	0.2	13.0	Observed	
18		F/Tremolite	5.0	0.3	16.7	Observed	
19		F/Tremolite	7.5	1.5	5.0	Observed	
20		F/Tremolite	6.0	0.3	20.0	Observed	
21		F/Tremolite	10.0	1	10.0	Observed	
22		B/Tremolite	7.0	0.7	10.0	Observed	
23		F/Tremolite	6.5	0.8	8.1	Observed	
24		F/Tremolite	4.0	0.7	5.7	Observed	
25	H6	B/Tremolite	12.0	0.9	13.3	Observed	<input checked="" type="checkbox"/>
26		F/Tremolite	7.0	0.3	23.3	Observed	
27		F/Tremolite	2.0	0.3	6.7	Observed	
28		F/Tremolite	5.8	0.7	8.3	Observed	
29		F/Tremolite	4.0	0.3	13.3	Observed	
30		B/Tremolite	7.0	0.6	11.7	Observed	<input checked="" type="checkbox"/>
31		B/Tremolite	10.0	0.9	11.1	Observed	
32		B/Tremolite	9.0	0.8	11.3	Observed	
33		F/Tremolite	4.0	0.5	8.0	Observed	
34		F/Tremolite	8.0	0.7	11.4	Observed	
35		F/Tremolite	5.0	0.3	16.7	Observed	<input checked="" type="checkbox"/>
36		F/Tremolite	3.0	0.4	7.5	Observed	
37		F/Tremolite	14.0	0.6	23.3	Observed	
38		B/Tremolite	10.0	0.9	11.1	Observed	
39		F/Tremolite	4.0	0.4	10.0	Observed	
40		B/Tremolite	8.0	1	8.0	Observed	<input checked="" type="checkbox"/>

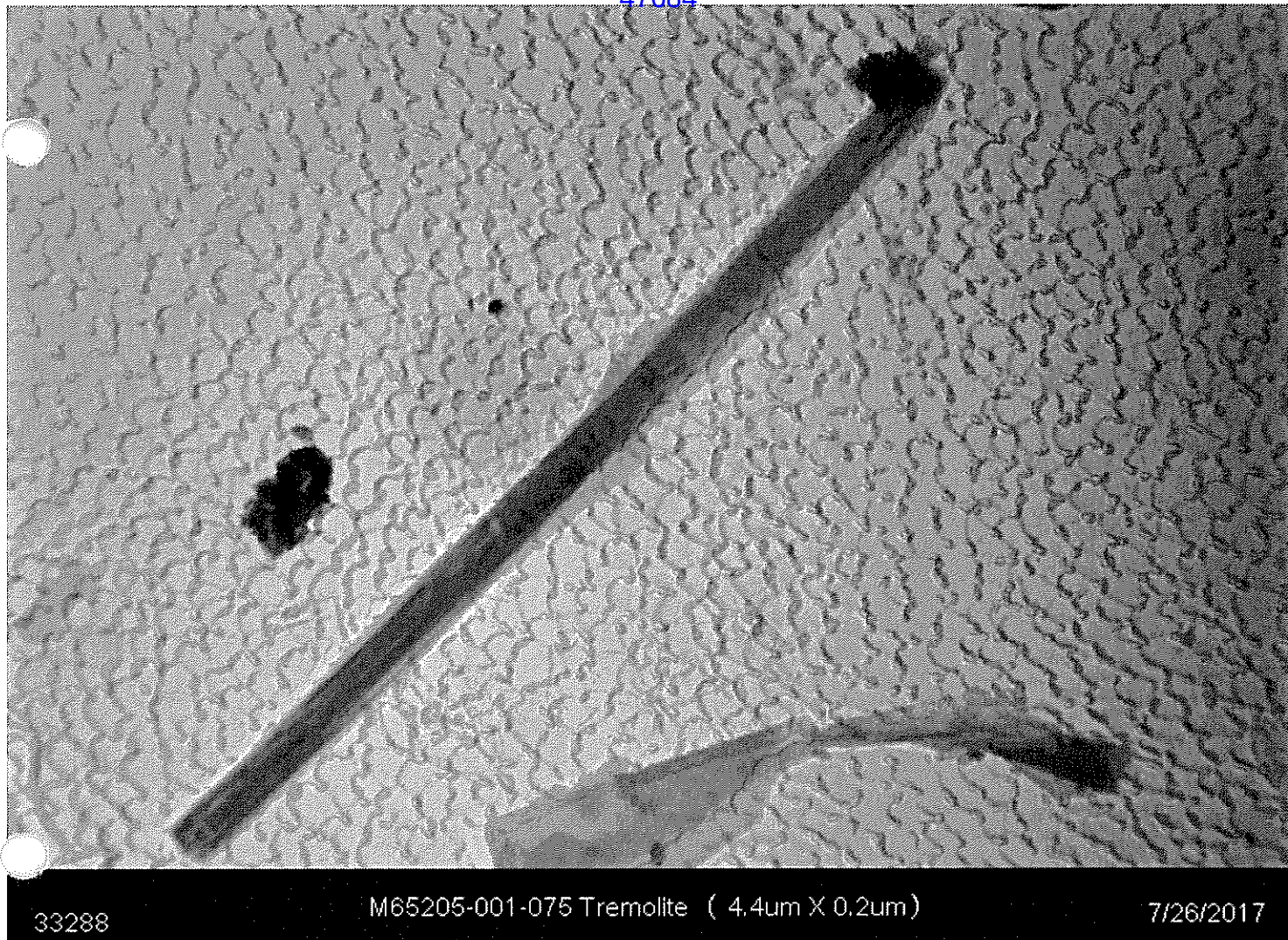
TEM Structure Count Sheet							
Project/ Sample No.	M65205-001		Grid Box #	8514	No. of Grids Counted	2	
Analyst:	Mehrdad Motamedi			Length	Width	G. O. Area	
Date of Analysis	2/21/2017- 2/22/2017- 7/25/2017-7/26/2017		G. O. In microns =	105	105	11025	
Initial Weight(g)	0.01224			105	105	11025	
Analysis Type	Post Separation Talc Analysis		Grid Acceptance	Yes	Average	11025	
Scope No.	Accelerating Voltage	100 KV	Loading%	40%	G.O.s Counted	10	
2	Screen Magnification	20 KX	Area Examined mm²			0.110	
41	C9	F/Tremolite	4.0	0.7	5.7	Observed	
42		B/Tremolite	9.0	0.8	11.3	Observed	
43		F/Tremolite	5.0	0.7	7.1	Observed	
44		F/Tremolite	7.0	0.4	17.5	Observed	
45		B/Tremolite	6.0	0.8	7.5	Observed	<input checked="" type="checkbox"/>
46		F/Tremolite	8.0	0.7	11.4	Observed	
47		F/Tremolite	6.5	0.3	21.7	Observed	
48		F/Tremolite	7.0	0.3	23.3	Observed	
49		B/Tremolite	16.0	0.9	17.8	Observed	
50		F/Tremolite	4.3	0.3	14.3	Observed	<input checked="" type="checkbox"/>
51		F/Tremolite	6.0	0.8	7.5	Observed	
52		F/Tremolite	4.0	0.6	6.7	Observed	
53		B/Tremolite	4.5	0.7	6.4	Observed	
54		B/Tremolite	7.0	1	7.0	Observed	
55	D8-B5	B/Tremolite	16.0	2	8.0	Observed	<input checked="" type="checkbox"/>
56		F/Tremolite	7.0	0.3	23.3	Observed	
57		F/Tremolite	4.0	0.4	10.0	Observed	
58		F/Tremolite	4.0	0.3	13.3	Observed	
59		B/Tremolite	8.0	0.9	8.9	Observed	
60		B/Tremolite	8.0	1	8.0	Observed	<input checked="" type="checkbox"/>
61		F/Tremolite	2.0	0.4	5.0	Observed	
62		F/Tremolite	3.7	0.4	9.3	Observed	
63	C7	F/Tremolite	8.0	0.5	16.0	Observed	
64		B/Tremolite	6.0	0.7	8.6	Observed	
65		F/Tremolite	6.0	0.2	30.0	Observed	<input checked="" type="checkbox"/>
66		F/Tremolite	2.0	0.3	6.7	Observed	
67		F/Tremolite	14.0	1	14.0	Observed	
68		B/Tremolite	16.0	0.9	17.8	Observed	
69		F/Tremolite	3.5	0.4	8.8	Observed	
70		B/Tremolite	16.0	0.9	17.8	Observed	<input checked="" type="checkbox"/>
71		F/Tremolite	9.0	0.8	11.3	Observed	
72		F/Tremolite	9.0	0.4	22.5	Observed	
73		F/Tremolite	4.5	0.5	9.0	Observed	
74	F7	F/Tremolite	4.3	0.5	8.6	Observed	
75		F/Tremolite	4.4	0.2	22.0	Observed	<input checked="" type="checkbox"/>
76		F/Tremolite	4.0	0.6	6.7	Observed	
77		B/Tremolite	18.0	2	9.0	Observed	
78		F/Tremolite	2.4	0.2	12.0	Observed	
79		F/Tremolite	2.2	0.3	7.3	Observed	
80		F/Tremolite	6.3	0.2	31.5	Observed	<input checked="" type="checkbox"/>
81		B/Tremolite	4.6	0.4	11.5	Observed	
82	H4	B/Tremolite	11.0	1	11.0	Observed	
83		F/Tremolite	4.0	0.2	20.0	Observed	



33256

M65205-001-007 Tremolite (3.0um X 0.4um)

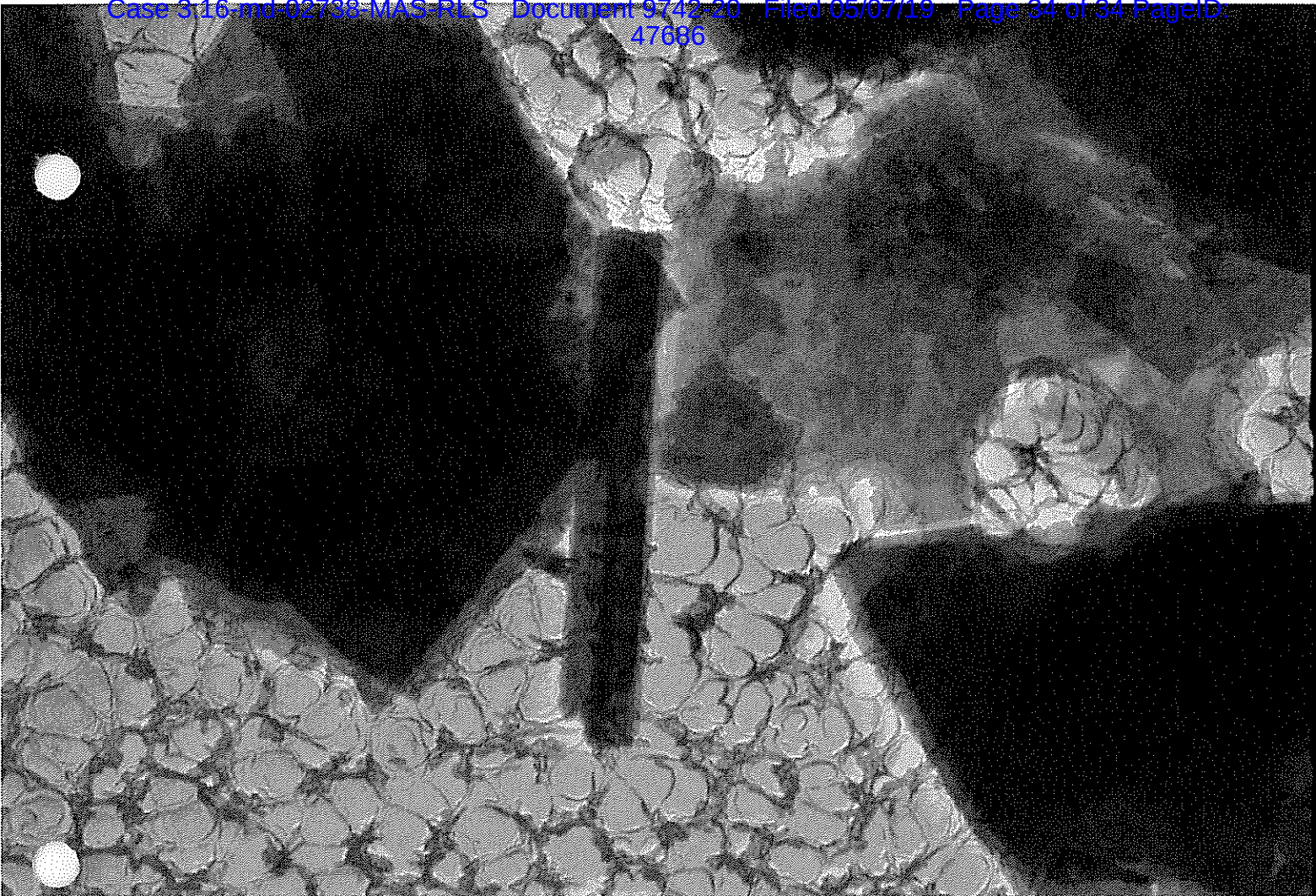
7/25/2017



TEM Structure Count Sheet

Project/ Sample No.	M66514-001		Grid Box #	8537	No. of Grids Counted	2
Analyst:	Anthony Keeton			Length	Width	G. O. Area
Date of Analysis	5/12/2017		G. O. in microns =	105	105	11025
Initial Weight(g)	0.02028			105	105	11025
Analysis Type	Post Separation Talc Analysis		Grid Acceptance	Yes	Average	11025
Scope No.	Accelerating Voltage	100 KV	Loading%	45%	G.O.s Counted	40
2	Screen Magnification	20 KX	Area Examined mm²			0.441

Str. #	Grid Opening	Str./Asb. Type	Length	Width	Ratio	SAED	EDS
1	E7-A1	B/Antho	5.8	0.45	12.9	Observed	<input checked="" type="checkbox"/>
2	A2	F/Antho	7.2	0.9	8.0	Observed	<input checked="" type="checkbox"/>
3		F/Antho	7.2	0.45	16.0	Observed	<input checked="" type="checkbox"/>
4		F/Antho	4	0.4	10.0	Observed	<input checked="" type="checkbox"/>
5	A8	B/Antho	5.8	0.4	14.5	Observed	<input checked="" type="checkbox"/>
6		F/Antho	2.7	0.4	6.8	Observed	<input checked="" type="checkbox"/>
	B2	NSD					
7	B5	B/Antho	17.3	1.3	13.3	Observed	<input checked="" type="checkbox"/>
	B7	NSD					
8	C1	F/Antho	25.7	0.6	42.8	Observed	<input checked="" type="checkbox"/>
	C3	NSD					
	C9	NSD					
	D3	NSD					
	D4	NSD					
	D5	NSD					
	G5	NSD					
	G6	NSD					
	G7	NSD					
9	H1	F/Antho	16.2	1.5	10.8	Observed	<input checked="" type="checkbox"/>
	H5	NSD					
	I8	NSD					
	J5	NSD					
	J6	NSD					
	E8-A6	NSD					
	A7	NSD					
	A8	NSD					
	B4	NSD					
	B5	NSD					
	B6	NSD					
	C7	NSD					
	C8	NSD					
	C9	NSD					
10	D3	B/Antho	9.2	0.7	13.1	Observed	<input checked="" type="checkbox"/>
	D6	NSD					
	D7	NSD					
11	F10	F/Antho	10.3	0.7	14.7	Observed	<input checked="" type="checkbox"/>
	G3	NSD					
	G4	NSD					
	G5	NSD					
	I5	NSD					



2 1204

M66514-001-006 Anthophyllite (2.7 um x 0.4 um)

5/15/2017